

t-Test for Correlated Samples

Group 1

Musical Performance Quality

1. Perform some preliminary computations.

subject	pretest score	posttest score		
i	X_i	Y_i	D_i	D_i^2
1	14	17	3	9
2	14	16	2	4
3	18	21	3	9
4	12	10	-2	4
5	13	18	5	25
6	18	16	-2	4
7	17	13.5	-3.5	12.25
8	18	15	-3	9
9	14	8	-6	36
10	13	14	1	1
11	11	18	7	49
12	17	16	-1	1
13	13	20	7	49
14	13	19	6	36
15	8	17	9	81
16	15	18	3	9
17	14	12	-2	4

count

N
17

\bar{D}
1.56

2. Calculate the standard error of the difference between two means when observations are paired.

$$s_D = \sqrt{\frac{\sum_{i=1}^N D_i^2 - \frac{(\sum_{i=1}^N D_i)^2}{N}}{N(N-1)}} = 18.50$$

3. Calculate the t-ratio.

$$t = \frac{\bar{D}}{s_d} = 0.08$$

4. Evaluate the null hypothesis.

$$H_0: \mu_X = \mu_Y$$

$$H_A: \mu_X \neq \mu_Y$$

With 16 degrees of freedom, the critical t -value of 2.120 is required for significance at the .05 level for a two-tailed test.

Since the obtained t -value is 0.08, one would accept the null hypothesis and conclude that the difference between means is not statistically significant.